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ABSTRACT

The need to determine eligibility for a program for intellectually gifted students resulted in combining deviation scores on achievement, aptitude, ability and motivation measures into a matrix score. These matrix scores and the students' success in the program were determined for present participants. Students were classified as successful or unsuccessful by their teachers, and mean matrix scores for samples of each group were determined. A t-test indicated a statistically significant difference between those mean scores. The recommended matrix score for eligibility for new students was set at the mean of successful students' scores minus one standard deviation. That score may be adjusted for reasons of over- or undersubscription to the program. Ethnic and sex balance may also require adjustments. (Author)

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A REASONABLY SATISFACTORY WAY OF IDENTIFYING INTELLECTUALLY GIFTED STUDENTS

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With the recent surge of interest in gifted education has come an urgent need for equitable, efficient, and effective methods of identifying gifted students. Once the area of giftedness with which a school district wishes to deal is determined, the search for adequate methods begins. Tacoma Public Schools chose to concentrate first on its intellectually gifted students.

Prior to 1978, students in Tacoma were invited to participate in the gifted program by means of the judgment of untrained, regular classroom teachers. The available program was more one of enrichment than truly gifted education. For 1978-79, students had to meet criteria on both a group aptitude test (SFTAA (1)) and an achievement test battery (CTBS (2)). Missing or incomplete records caused several students to be overlooked by these stringent requirements and so for 1979-80, criterion on either the aptitude or the achievement battery was acceptable. The Structure of Intellect gifted screen (SOI) (3) was introduced in the spring of 1980, and reaching criterion on it became the measure of eligibility for 1980-81. Because all nominees were required to take the SOI, the missing data problem was eliminated; but since SOI measures ability rather than achievement, some gifted underachievers were admitted to a program which was not designed for them and in which they could not succeed.

These experiences led to the investigation of some combination of achievement, aptitude, ability, and motivation scores as a means of determining eligibility. The combination chosen relied upon a form of the Baldwin Matrix (4), summing deviation scores from the TPS Nomination Check List (Appendix A), the district's standardized aptitude and achievement test scores, and the SOI (Appendix B). Reasoning that teachers of the gifted should be able to distinguish gifted from non-gifted students after teaching them for a year, the judgment of those teachers was used as the classification criterion against which matrix scores of the present gifted students were sorted.

Teachers returned 244 usable responses, rating on a scale of "1" (low) to "4" (high) students' suitability for their gifted classes (Appendix C). Matrix scores were available for these students. Table I shows means, standard deviations, standard errors of the means, and numbers of subjects for the four groups, as well as t-tests for significance of differences between various pairs of means. No significant difference was found between the two lowest groups - students whose teachers judged them to be unsuitable or at best questionable for participation in a gifted class. Groups 1 and 2, therefore, were combined and their mean score tested against the group 3 mean (students who were judged fairly well suited) and the combined groups 3 and 4 means. The differences were highly significant in both cases.

Since the mean score for group 3 was 3.03, with a standard error of the mean of 0.005, an eligibility score of 3.00 seemed reasonable. Using this

criterion score, frequency distributions were plotted (Figure 1) and calculations performed to determine the number of false positives (students whose matrix scores declare them eligible but whose teachers disagree) and false negatives (students whose teachers believe them to be gifted, but whose matrix scores indicate otherwise).

The success rate for the criterion was calculated to be 72%, if groups 3 and 4 were considered qualified and groups 1 and 2 not qualified. Although this is not as high a success rate as one might like to see, it does ensure that most of those declared eligible will be qualified (according to the gifted teachers' standards). An accessible and sympathetic appeal process will help those false negatives enter the program if they so desire. Constructive, supportive exit processes are available for those who feel they would be better off out of the gifted program.

Figure 2 represents the relationships among matrix scores and their components. At this state in our development of identification criteria, we rely mainly on several forms of aptitude, achievement, and motivation scores. Since ours is an intellectually gifted program, this is justifiable, although it will be nice to add some measures of intellectual creativity other than the two SOI subtests. Note that most 3.00 matrix scores fall within the area of SFTAA - Total IQ greater than or equal to 116, and/or SOI four or more gifted subtests. Note, too, that whereas about half of the scores between 2.40 and 2.99 show achievement scores greater than the 90th percentile, most of these also show IQ scores equal to or above 121 and/or SOI's at or above 4 gifted subtests. This picture, then, presents further evidence that the matrix is a fair composite of the individual criteria and that those whose scores indicate eligibility are indeed qualified for an intellectually oriented gifted program; although others who might be qualified do not look eligible according to their matrix score. Figures 3 and 4 show the same pictures for those in groups 3 and 4 and for groups 1 and 2.

The advantage of the matrix score over the separate criteria is its ability to compensate for missing data or unusual tests. Thus, a student who transfers from another district can have his/her test scores (which may differ from Tacoma's battery) or other data inserted with the SOI, and a matrix score comparable to that of local students calculated. Additional testing which may be needed in special circumstances can also be accommodated. As intellectual creativity measures are developed or discovered and tested, they can be added to the basic matrix framework.

As the gifted programs become more subject-specific, the identification system will have to meet those needs. The basic matrix framework seems to be flexible enough to adapt to these changing requirements without losing its usefulness. It may help us maintain comparable eligibility standards across different sets of criteria developed for such diverse areas as visual and/or performing arts, specific academic disciplines, or mechanical/spatial gifts. The system also permits use of local standards for the setting of the criterion score, since that score may be chosen on the basis of local desires and needs.

Nothing has been said about gifted children with special problems, because this system is not useful for underachieving or learning disabled gifted children, nor for children with other handicaps which interfere with their test taking or normal school activities. This presents no immediate problem in our district, since our program is not useful for these children either. However, when programs are available for these students, suitable measures of their abilities will have to be found or developed and the matrix adapted to them or abandoned in favor of a more useful tool.

No system is perfect, and this one has its flaws. The most evident problem, however, is not with the form, or the tests, or the statistics, but with the procedure for finding children to be assessed for eligibility. At present, we rely upon principals to ask their staffs to recommend students in the proper grades. Word of mouth brings inquiries from a few parents. The system fails to find those children who prefer to hide behind averageness in the classroom, or whose behavior is otherwise such that teachers will not consider them anything but nuisances. It cannot force a teacher who does not want to lose his/her star student to send in a nomination, nor can it prepare teachers to recognize all the forms giftedness may take in a classroom. Regular classroom teachers, untrained in recognizing gifted children, generally overlook many, and nominate the well behaved, well dressed, high achievers. Once the students are nominated, the system does work. Further effort is needed, of course, to improve its validity and particularly its predictive powers. The relationships among the parts need further study. Although intercorrelations are only moderate, and thus little redundancy seems to exist, it will be necessary as components of the matrix change, to regularly review procedures and relationships to maintain the highest efficiency and predictive validity possible.

For the present, given Tacoma's intellectually oriented gifted program, the resources in terms of professional time and money, the level of specificity of the definition of giftedness, and the state of the art of measurement of those gifts, the matrix system appears to be a reasonably satisfactory procedure for determining eligibility for gifted programs.

Notes

1. SFTAA: *Short Form Test of Academic Aptitude*, published by CTB/McGraw Hill. Verbal, nonverbal, total scores in the form of IQ are obtained, but only the verbal and nonverbal are considered in the matrix.

2. CTBS: *Comprehensive Tests of Basic Skills*, published by CTB/McGraw Hill. Reading, language usage, math, and total battery national percentile scores are obtained with reading, language and math scores considered in the matrix. Since Tacoma's norms and the national norms are very close, national norms were used to establish the deviation scores for both SFTAA and CTBS.

3. SOI: The gifted screen form of the *Structure of Intellect*, a learning abilities test based upon Guilford's model of mental abilities. Published by SOI Institute, 343 Richmond St. El Segundo, CA 90245. A score in the 94th percentile or above for a student's grade placement indicates giftedness in that ability. Three or more subtests in the gifted range indicate overall giftedness; however, a minimum of 5 should be set as criterion when this is the only data considered.

4. Baldwin Matrix: *Baldwin Identification Matrix* is a system developed for multi-criteria identification of gifted children. Published by D.O.K., 71 Radcliffe Rd, Buffalo, NY 14214.

TABLE I

Comparison of Matrix Scores of Students
From the 1980-81 Gifted Program
Rated at Four Levels of Success

Group	Matrix Score			Combined Scores		
	Mean	Standard Deviation	Standard Error of Mean	Mean	SD	$SE_{\bar{x}}$
Clearly suitable students (rated "4") N = 99	3.47	0.52	0.005	3.25***	0.57	0.003
Fairly suitable students (rated "3") N = 99	3.03**	0.53	0.005			
Questionably suitable students (rated "2") N = 25	2.76*	0.64	0.027	2.74*** (N = 46)	0.57	0.127
Unsuitable students (rated "1") N = 21	2.71*	0.49	0.024			

*(comparing means with *) t = 0.26, df = 44, not significant

**(comparing means with **) t = 2.94, df = 143, $p < 0.01$

***(comparing means with ***) t = 5.43, df = 242, $p < 0.001$

FIGURE 1

Distribution of Matrix Scores by Suitability Groups
Group 1 = Unsuitable, to Group 4 = Definitely Suitable

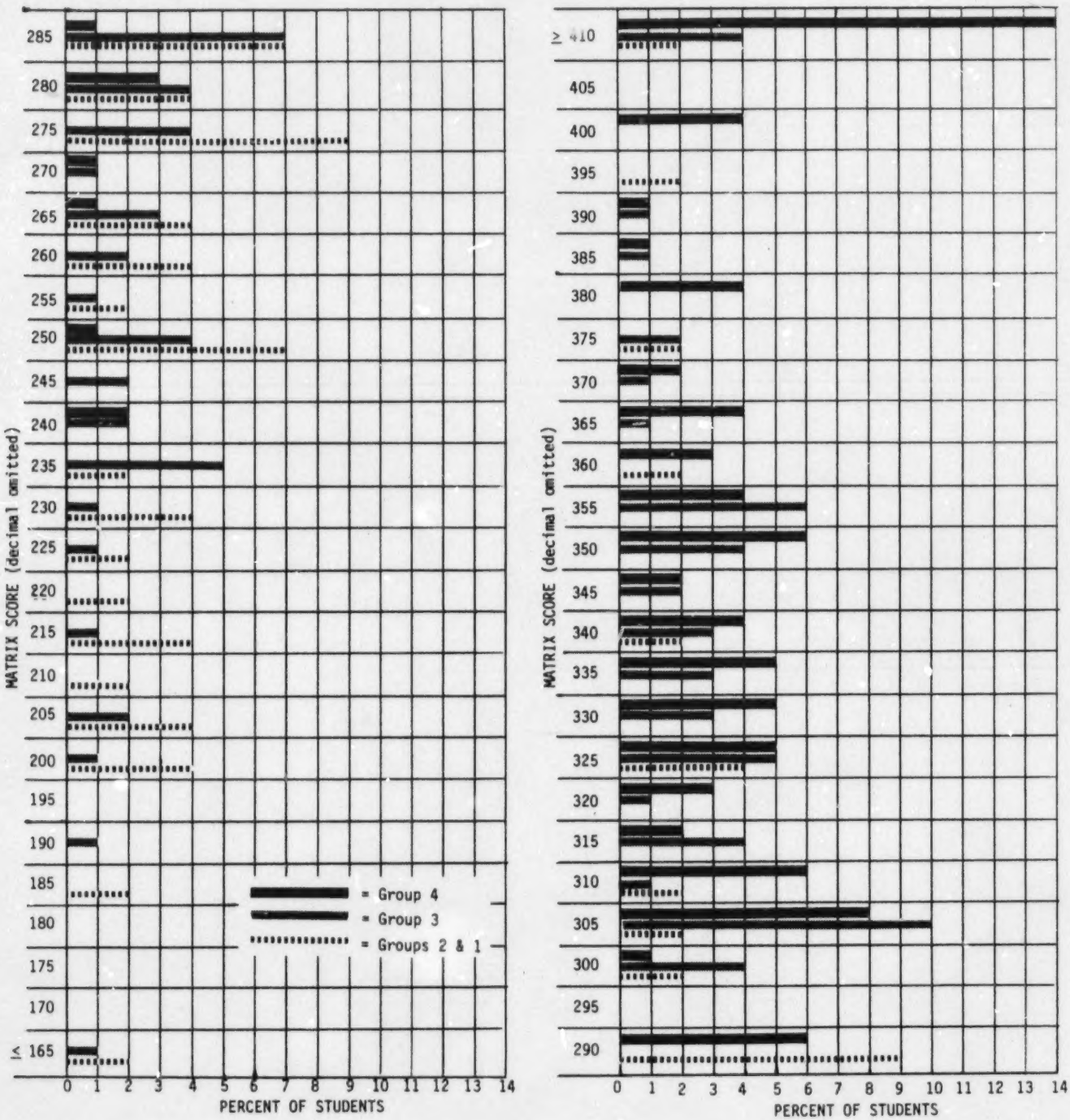

FIGURE 2

Distribution of Matrix Scores (decimal omitted)
Cross-tabulated by Number of SOI Gifted Subtests and SFTAA-Total IQ Score
(All Groups)

	≤ 100	101-105	106-110	111-115	116-120	121-125	126-130	131-135	136-140	≥ 141
0			(169)	194						
1			(206)	169		238 (247)				
2			169 265 200 282 207	188 256 200 (257) 219 (265) 231	219 (238) (238) (275)	206 (265) 225 (288) 250 (253)	(238)	250		
3	219	231 238 (244) 250	229 265 238 269 238 (247)	244 269 244 280 247 282 (263) (288) 269	253 (294) 282 300 (294) 325	(206) 306 263 306 (281) 313 (288) 319 (288) 356 300	253 300 267 306 (275) 325 (294) 325	(282) 306 306 313	325	325
4		244 250 (288) 306	259 (281) (288) 294 306	(231) 300 (275) 306 (281) 306 294 306 294 306 294	(256) 306 (275) 312 (275) 325 (275)	274 313 338 294 325 341 300 325 344 306 325 347 306 331 350 312 333	(213) 338 287 338 319 344 331 350	306 325 313 331 319 381	331 394	338 340 377
5		269	276 318 (282) 319 288 335 306 344	(281) 306 288 318 288 350 (294) 356 306	312 335 329 344 331 344 331 353	324 335 331 359 331 363	338 356 394	350 369 387	344 347 350 353	
6	325	288 306	288	324 363 350 371 356	329 369	320 359 329 363 347 419 356	343 376 359 400 367	356 381 356 400	350 353	360 381
7			365	369 375	371 400 406 418	394 419	419 419	419 444	406	425
8				388		413	438 459	444 453	419 444 459	425
9								476		
10										513

An ◯ around a matrix score of <300 indicates CTBS scores at or above 90th percentile.

FIGURE 3

Distribution of Matrix Scores (decimal omitted)
Cross-tabulated by Number of SOI Gifted Subtests and SFTAA-Total IQ Score
(Groups 3 and 4)

	≤ 100	101-105	106-110	111-115	116-120	121-125	126-130	131-135	136-140	≥ 141
0			(169)	194						
1			(206)							
2			200 238 282	231 256 (265)	(238)	(225) 250 (253) (265) (288)	(238)			
3		238 (244)	238 (247) 265	244 244 247** (263) 282	282 (294) (294) 300 325	(206) 306 (281) 313 (288) 319 300 356	253* 306 (275) 325 (294) 325 300	306 313		325
4		244 250 (288) 306	(281) (288) 306	(275) 306 (281) 306 294 306 294 306 300	(275) (275) 306 312	306 331 306 338 312 341 313 344 325 347 325 350	287* 338 319 344 331 350 338	306 319 325	331 394	338
5		269	(282) 319 306 319 306 335 318	(281) 306 288 318 288 350 (294) 356	312 335 329 344 331 344 331 353	324 335 331 359 331 363	338 356 394	350 369 381 387	344 347 350 353	
6		306	288	324 363 350 371 356	329 369	320 359 329 363 347 419 356	343 376 359 400 367	356 356 400	350 353	381
7				369 375	371 400 406 418	419	419	419 444		425
8				388		413	438 459	444 453	419 444 459	425
9								476		
10										513

An (○) around a matrix score of < 300 indicates CTBS scores at or above 90th percentile.
*Reading score is in 99th percentile. Other parts of battery and total unavailable.
**Total battery unavailable. Reading at 94th percentile.

FIGURE 4

Distribution of Matrix Scores (decimal omitted)
Cross-tabulated by Number of SOI Gifted Subtests and SFTAA-Total IQ Score
(Groups 1 and 2)

	≤ 100	101-105	106-110	111-115	116-120	121-125	126-130	131-135	136-140	≥ 141
0										
1				169						
2			207 265	188 200 219	219 (238) (275)	206		250		
3	219	231 250	229	280	253	263 306	267	(282)		
4			259 288 294	(231) 294	(256) (275) 325	274 294 300	(213)	313		340 377
5			288							
6	325	288								360
7						394	419			
8										
9										
10										

An ◯ around a matrix score of < 300 indicates CTBS scores at or above 90th percentile.

TACOMA PUBLIC SCHOOLS
P.O. Box 1357
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OFFICE OF RESEARCH AND EVALUATION

NOMINATION OF STUDENT FOR GIFTED PROGRAM - TPS #10

(Please return as soon as possible to the Office of the Gifted)

Student's Name_____ School_____ Age_____ Birth Date_____(mo/yr)

Teacher's Name_____ Parent(s)' Name(s)_____

Parent(s)' Address_____ Phone_____

Relationship of person filling in this form_____ Date_____

Please circle the letter which you believe best describes the amount of each characteristic the student displays. The information will be used as part of the ongoing research project on gifted children in the District. Your best judgement will be helpful. Any additional information you would like to share may be written on the back.

	Low			High
1. Reads widely and a great deal	A	B	C	D
2. Outstanding in math	A	B	C	D
3. Wide range of interests	A	B	C	D
4. Likes to work alone	A	B	C	D
5. Likes to solve problems	A	B	C	D
6. Large vocabulary for age	A	B	C	D
7. Above average language development	A	B	C	D
8. Sticks to an interesting activity	A	B	C	D
9. Knows a great deal about many subjects	A	B	C	D
10. Desires to excel	A	B	C	D
11. Learns quickly and easily if motivated	A	B	C	D
12. Enjoys complexity	A	B	C	D
13. Keen sense of humor	A	B	C	D
14. Anticipates outcomes (of experiments, e.g.)	A	B	C	D
15. Excellent memory	A	B	C	D
16. Long attention span	A	B	C	D
17. Prefers to choose own activities	A	B	C	D
18. Sets own goals	A	B	C	D
19. Examines others' opinions before acceptance	A	B	C	D
20. Forms own opinions and judgements	A	B	C	D
21. Interested in "adult" subjects such as politics, current events, religion, world problems	A	B	C	D
22. Finishes projects once started	A	B	C	D
23. Prefers company of older children and/or adults	A	B	C	D
24. Presents unusual ideas and approaches to problem solving	A	B	C	D
25. Reasons out solutions to problems	A	B	C	D
26. Aware of detail - keen observer	A	B	C	D
27. Is a high achiever	A	B	C	D
28. Is very creative	A	B	C	D
29. Belongs in a gifted program	A	B	C	D

IRM/le (OVER) 11 6/80

30. Any comments, or additional information about this student will be helpful:

TACOMA PUBLIC SCHOOLS

Appendix B

MATRIX FOR IDENTIFICATION OF GIFTED

Student's Name_____ School_____ Birthdate_____

Date_____ Grade____ Parent(s) Name(s)_____ Phone_____

Parent(s) Address_____

Place an "x" in box containing this child's score for each measure.

Student ID#_____

Race_____ Sex_____

Example:

Measurement	Weights 5	4	3
I.Q.	140 +	130-139 X	120-129
Check list	115 + x	108	100

Measurement	Weights 5	4	3	2	1
1. TPS Nomination form (total points)	116-112	111-107	106-102	99-102	
2. Short Form Test of Academic Aptitude (I.Q. score)					
Verbal	ABOVE 126	118-126	109-117	101-108	100 or LESS
Non-verbal	ABOVE 126	118-126	109-117	101-108	100 or LESS
3. Comprehensive Tests of Basic Skills (%ile rank)					
Reading	ABOVE 95	81-95	66-80	51-65	50 or BELOW
Language Arts	ABOVE 95	81-95	66-80	51-65	50 or BELOW
Math	ABOVE 95	81-95	66-80	51-65	50 or BELOW
4. Structure of Intellect					
CFU	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
CMU	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
CMR	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
CMS	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
NST	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
MSU	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
MSS	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
NSI	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
DFU	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
DMU	GIFTED +	GIFTED	SUPERIOR +	SUPERIOR	GRADE LEVEL
Total Subtests in Gifted Range (x2) (Place two X's in appropriate box)	10	9	7-8	5-6	3-4
5. Other scales, tests, instruments					
Name_____ (Type of score_____)					
Name_____ (Type of score_____)					
Name_____ (Type of score_____)					
Add number of x's:	_____	_____	_____	_____	_____
Multiply by Weights:	5	4	3	2	1
Subtotals:	_____	_____	_____	_____	_____

Sum of subtotals____ + total number of boxes actually entered____ = Unit Score _____

If you wish to add comments, use reverse and check here_____.

IRM/jf
11/80

Appendix C

Tacoma Public Schools

Research on Identification
& Selection of Gifted

RATING FORM FOR STUDENTS IN GIFTED PROGRAMS

Teacher's Name_____Program: JAWS ____APEX ____ SAIL ____

School_____Grade Level_____ Date_____

Please rate all your students on the following items, using this scale:

4= strongly agree; 3= agree; 2= disagree; 1= strongly disagree; 0= no judgement

These ratings will be used as criteria for determining the success of our identification system, and for determining a cutting score for next year's eligibility. Please consider all aspects of the students' performance in your class, separating as best you can creativity and high achievement, and then the students' overall functioning.

Please return to Dr. Mazer by February 20, or earlier if possible.

Thank you.

	This student		
Student name	is a high achiever	is very creative	belongs in a gifted program